FACT SHEET FOR STATE RECLAIMED WATER PERMIT ST 6210

CARDINAL FLOAT GLASS WINLOCK WATER RECLAMATION PLANT

SUMMARY

The Cardinal Float Glass Winlock Water Reclamation Plant is located along Avery Road, north of Winlock in Lewis County, Washington. The float glass plant is a new facility that will produce glass for sale and use for glass products. Domestic wastewater from the manufacturing plant's restrooms, showers and dining room facilities will be collected and treated in a membrane bioreactor treatment facility. The plant will produce Class A reclaimed water for reuse at the glass manufacturing facility's SO2 stack scrubber. One hundred percent of the reclaimed water produced will be used along with cooling water blowdown, water purchased from the City of Winlock in the reagent water used to produce a seven percent (7%) soda ash slurry to the stack scrubber. No other uses will be considered.

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INTRODUCTION

This fact sheet is a companion document to the draft State Reclaimed Water Permit No. ST 6210. The Departments of Health and Ecology (the Departments) are proposing to issue this permit, which will allow the beneficial use of reclaimed water. This fact sheet explains the nature of the proposed reclamation and reuse treatment, distribution and use, the Departments' decisions on limiting the contaminants and constituents in the reclaimed water, and the regulatory and technical bases for those decisions.

The Reclaimed Water Act, Chapter 90.46 Revised Code of Washington (RCW), authorized the development of Water Reclamation and Reuse Standards for the beneficial use of reclaimed water. These standards were completed in 1997. All reclaimed water permits issued by the Department of Ecology must specify conditions demonstrating that the wastewater has been adequately and reliably treated to meet the requirements in the Water Reclamation and Reuse Standards appropriate for the use. In addition to meeting the water quality limitations, the standards require specific treatment and disinfection requirements beyond those of most conventional wastewater treatment facilities. The standards also require automated alarms, redundancy of treatment units, emergency storage, stringent operator training requirements and public notification of reclaimed water use.

Under the Reclaimed Water Act, a permit is issued to the generator of the reclaimed water who may then distribute the water subject to the permitted provisions governing the location, rate, water quality and purposes of use. RCW 90.46.030 states that the Department of Health may issue a permit for industrial and commercial uses of reclaimed water and that the permits will govern the location, rate, water quality and purposes of use. Per memorandum of agreement between the Department of Ecology and the Department of Health, the Department of Health requirements are included in a single permit issued by the Department of Ecology.

In addition to the Water Reclamation and Reuse Standards, regulations adopted by the state include procedures for issuing permits in Chapter 173-216 Washington Administrative Code (WAC). The Reclaimed Water Act, the Water Reclamation and Reuse Standards, and these regulations establish the basis for effluent limitations and other requirements which are included in the permit.

This fact sheet and draft permit are available for review by interested persons as described in Appendix A--Public Involvement Information.

The fact sheet and draft permit have been reviewed by the Washington State Departments of Health and Ecology and by the Permittee. Errors and omissions identified in these reviews have been corrected before going to public notice. After the public comment period has closed, the Departments will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. Changes to the permit will be addressed in Appendix D--Response to Comments

GENERAL INFORMATION	
Applicant	Cardinal Float Glass Winlock
Facility Name and Address	Cardinal Float Glass Winlock 545 Avery Road West Winlock, Washington 98596
Type of Treatment System	Membrane Bioreactor with hypochlorite disinfection
Use Area/Discharge Location	Latitude: 46° 32' 34" N Longitude: 122° 55' 47" W.
Legal Description of Use Area(s)	Section, township, range: NW¼, SW¼, NW¼, Section 10, Township 12 North, Range 2 West.
Contact at Facility	Name: Steve Smith Telephone #: (360) 242-4001
Responsible Official	Name: Steve Smith Title: Plant Manager Address: 545 Avery Road West, Winlock, Washington 98596 Telephone #: (360) 242-4010 FAX #: (360) 740- 0299 Email: ssmith@cardinalcorp.com

BACKGROUND INFORMATION

DESCRIPTION OF THE COLLECTION AND TREATMENT SYSTEM

HISTORY

The Cardinal Float Glass Water Reclamation Plant is a new facility. Construction of the water reclamation facility is scheduled to be completed and in operation prior to August 1, 2006. The water reclamation plant was constructed as support facilities to the new Cardinal Float Glass Plant that began construction in May, 2005.

COLLECTION SYSTEM STATUS

The sewer collection and drain system was constructed new during the construction of the Cardinal Float Glass Plant. The facilities will be constructed of approximately 1,400 lineal feet of 8-inch diameter PVC gravity sewer. The collection system should not be subject to any significant infiltration and inflow due to its age, location within structures, and short distances. The collection system serves specific locations within the glass manufacturing plant and is not subject to expansion.

TREATMENT PROCESSES

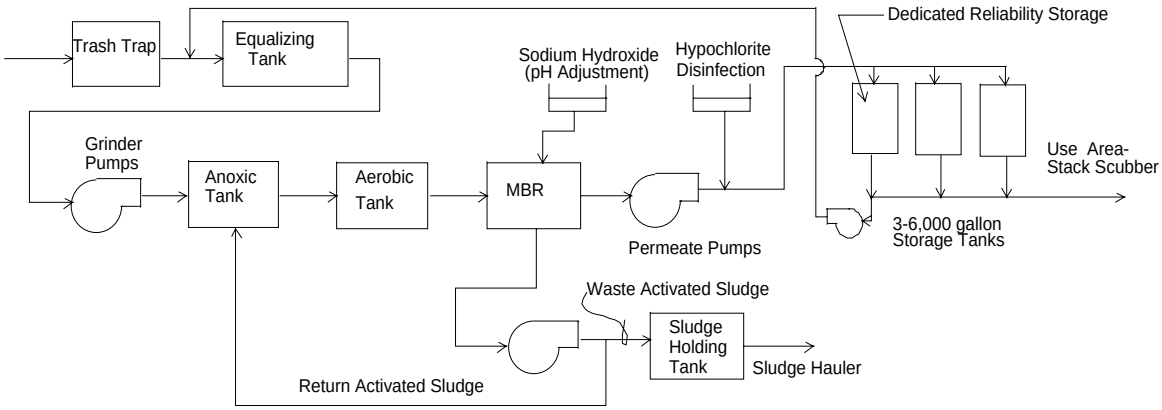
Reclaimed water is produced from domestic wastewater generated by the employees of Cardinal Float Glass Winlock's glass manufacturing facility. This is a new water reclamation treatment and production facility. Plant construction is scheduled to be completed and operational prior to August 1, 2006.

The plant was designed to produce Class A reclaimed using Zenon's hollow fiber membrane bioreactor process providing biological nutrient removal for nitrogen reduction followed by disinfection by sodium hypochlorite. Membrane bioreactors are a wastewater treatment and reclaimed water production process that provides oxidation, clarification and filtration in a single step. The plant is rated to produce a maximum of 20,000 gallons per day (gpd) with an average daily flow is 5,740 gpd.

The wastewater's source is the restrooms, shower facilities, and dining room serving the Cardinal Float Glass plant. Several small waste and service drains in the plant are also routed to the water reclamation facilities. No industrial waste will be collected. All cleaning materials that could be flushed to and collected by the sewer system will not contain any substances considered harmful to the treatment process or considered to be toxic.

This plant is classified as a tertiary level treatment plant requiring a Level III certified wastewater treatment plant operator will be at the plant site as required to operate the water reclamation facilities, provide direction and supervision to assistants and to meet permit requirements. It is anticipated that the Level III operator will be on-site one to four hours per week during normal operation. In addition, the Level III operator will be on-call 24-hours per day during operations to provide direction and supervision as required for the operations assistants, and respond to alarm and upset conditions based on control system notification. Assistants to the Level III operator will be at the plant seven days per week, 24 hours per day. Assistants to the Level III operator will be under the direction of the Level III operator in the course of their normal duties at all times. The plant will operate continuously.

Cardinal Float Glass Winlock Water Reclamation Plant Process Flow Diagram



This plant has been designed to conform to the reliability and redundancy requirements of the *1997 Water Reclamation and Reuse Standards.* The reclamation plant will be served with backup power through an emergency generator. All alarms will be sent to the Cardinal Facility that is monitored and staffed 24 hours per day, seven days per week. High turbidity levels or low chlorine residual levels will trigger cut-off of the effluent pumps and the influent grinder pumps. Storage will be provided in the equalizing basin until repairs are completed and the process is reset manually by the operator. Untreated or partially treated water will be stored as necessary in one of three 6,000 gallon storage tanks used to store water prior to use in the scrubber. Untreated or partially treated water will be returned from this storage to the equalizing basin.

Because this plant produces reclaimed water from domestic wastewater generated only at the Cardinal Float Glass Winlock facility plant, process expansions are not anticipated. In the event the staff at Cardinal Float Glass Winlock increases, potential improvements must be addressed through an engineering report that will assess such changes.

Cardinal Float Glass Winlock owns, operates, and maintains this water reclamation facility and is solely responsible for these requirements.

DISTRIBUTION SYSTEM AND USE AREA

Class A reclaimed water will be reused in conjunction with cooling tower blowdown and potable water purchased from the City of Winlock as reagent water to produce 7 percent (7%) soda ash slurry used in the float glass plant's SO2 stack gas scrubber. One hundred percent (100%) of the reclaimed water produced will be reused to supplement the stack scrubber water requirements. The plant is designed to produce 20,000 gallons per day (gpd), and is projected to produce a maximum monthly average flow of 10,000 gpd.

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks trash trap, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste at the local landfill. To prevent water quality problems the Permittee is required to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 Code of Federal Regulations (CFR) 503. The disposal of other solid waste is under the jurisdiction of the Lewis County Health Department.

Residual solids management will be handled through a licensed septage pumping vendor who will be under contract to periodically remove waste activated sludge and primary solids from the trash trap and dispose of them at a permitted biosolids management facility. The removal frequency of the residual solids will be addressed in the Operation and Maintenance Manual.

GROUND WATER

The beneficial use of the Class A reclaimed water at this facility will be completely used for reagent water for the SO2 gas scrubber in the glass manufacturing process and not affect local ground water.

PERMIT STATUS

This is a new facility. An application for a permit was submitted to the Departments of Health and Ecology on February 22, 2006, and accepted by the Departments of Health and Ecology on March 1, 2006.

RECLAIMED WATER CHARACTERIZATION

The quality of the reclaimed water prior to use will conform to the following parameters:

Table 1: Reclaimed Water Characterization

Parameter	**Concentration**
Biochemical Oxygen Demand	5 mg/L monthly average
Total Suspended Solids	5 mg/L monthly average
Dissolved Oxygen	Present
pH	6.5-8.0
Turbidity	0.2 NTU average, 0.5 NTU maximum
Total Coliform	Less than 2.2 per 100 mL media, 23 per 100 mL sample maximum

SEPA COMPLIANCE

The facility is in compliance with State Environmental Policy Act (SEPA) Requirements. A Final Environmental Impact Statement for this project has been completed and adopted by Lewis County.

WATER RIGHTS STATUS

The Permittee is considered the generator of the reclaimed water and RCW 90.46.120 gives the Permittee exclusive right to any water generated by the water reclamation facility. Use and distribution of reclaimed water is exempted from the water right permit requirements of RCW 90.03.250 and 90.44.060.

PROPOSED PERMIT LIMITATIONS

The Reclaimed Water Act, Chapter 90.46 RCW requires that reclaimed water be adequately and reliably treated prior to distribution and beneficial use. State regulations require that limitations set forth in a permit issued under Chapter 90.48 RCW must be either technology- or water quality-based. Municipal wastewater must also be treated using all known, available, and reasonable treatment (AKART) and not pollute the waters of the state. The minimum criteria to demonstrate compliance with these requirements are derived from the *Water Reclamation and Reuse Standards* and Chapter 173-221 WAC.

The more stringent of the water quality-based or technology-based limits are applied to each of the parameters of concern. Each of these types of limits is described in more detail below and were previously shown in Table 1.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

All reclaimed water permits must assure that the effluent has been adequately and reliably treated so that as a result of that treatment, it is suitable for a beneficial use or controlled use that would not otherwise occur and is no longer considered a wastewater [RCW 90.46.010(40)].

The authority and duties for reclaimed water use are in addition to those already provided in law with regard to sewage and wastewater collection, treatment and disposal for the protection of public health and the safety of the state's waters. All waste discharge permits issued by the Departments must specify conditions requiring all known available and reasonable methods of prevention, control, and treatment of discharges to waters of the state (WAC 173-216-110.

The Water Reclamation and Reuse Standards, 1997, outline the requirements for the additional level of treatment technology as well as water quality limits necessary for public health protection during the use of reclaimed water. The standards provide four classes of reclaimed water, Classes A, B, C, and D.

This facility produces Class A reclaimed water. Class A is the highest quality of reclaimed water and therefore provides the broadest range of reuse opportunities. Conversely, Class A reclaimed water requires the most stringent treatment and water quality limitations. The technology and water quality requirements for the production of Class A reclaimed water are as follows:

"Class A Reclaimed Water" is reclaimed water that had been adequately and reliably treated and, at a minimum is, at all times, an oxidized, coagulated, filtered and disinfected wastewater.

1. Oxidized is defined as wastewater in which the organic matter has been stabilized such that the biochemical oxygen demand (BOD_5) does not exceed 30 mg/L and total suspended solids (TSS) does not exceed 30 mg/L, is nonputrescible and contains dissolved oxygen. BOD_s and TSS levels are commonly at 5 mg/L in water produced by membrane bioreactors and membranes due to the levels of solids retained in the reactor by the membranes.

2. Coagulated wastewater is defined as an oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated prior to filtration by the addition of chemicals or by an equally effective method.

3. Filtered wastewater is defined as an oxidized, coagulated wastewater which has been passed through natural undisturbed soils or filter media, such as sand or anthracite, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 nephelometric turbidity units (NTU), determined monthly, and does not exceed 5 NTU at any time.

   The water quality capability provided by membrane based filtration greatly exceeds the capability of conventional filtration processes. The effluent turbidity limits for the membrane based processes is set at an average 0.2 NTU determined monthly, and not to exceed 0.5 NTU at any time. The reduction in turbidity limits in the permit recognizes the technology's capability and is established to assure the operational integrity of the membrane treatment system.

4. Adequate disinfection is defined as the median number of total coliform organisms in the wastewater after disinfection does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform organisms does not exceed 23 per 100 milliliters in any sample.

5. A 0.5 mg/L chlorine residual shall be maintained in the reclaimed water during conveyance from the reclamation facility to the use areas.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are specified to verify that the treatment process is functioning correctly, that ground water criteria are not violated, and that reclaimed water limitations are being achieved

INFLUENT AND EFFLUENT MONITORING

The monitoring and testing schedule is detailed in the proposed permit under Condition S2. Specified monitoring frequencies take into account the quantity and variability of the reclaimed water, the treatment method, and the proposed beneficial uses of the reclaimed water, the potential public health and environmental risks due to exposure to the reclaimed water, and cost of monitoring.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify appropriate reporting and recordkeeping requirements to prevent and control the distribution or use of inadequately treated reclaimed water.

FACILITY LOADING

The design criteria for this water reclamation facility are taken from March 2006 engineering report prepared by Auth Consulting & Associates and are as follows:

Monthly average flow (max. month):	5,740 gpd
Instantaneous peak flow:	20,000 gpd
BOD influent loading:	26.3 lbs/day
TSS influent loading:	27.4 lbs/day

The permit requires the Permittee to maintain adequate capacity to treat the flows and waste loading to the treatment plant (WAC 173-216-110[4]). The Permittee is required to submit an engineering report when the plant reaches 85 percent of its flow or loading capacity or in the event of plans to expand the workforce population for the float glass production facility

OPERATIONS AND MAINTENANCE

The proposed permit contains condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water pollution the Permittee is required in permit condition S6 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the local health district.

RECLAIMED WATER USE

These permit requirements are based on the Water Reclamation and Reuse Standards authorized in Chapter 90.46 RCW. The standards contain requirements to assure that distribution and use of reclaimed water are protective of public health and the environment at all times. These include prohibitions on bypass, alarms and storage or alternative disposal of substandard water, maintenance of operational records, cross connection control, use area restrictions and enforceable contracts and a local reclaimed water use ordinance.

GENERAL CONDITIONS

General Conditions are based directly on state laws and regulations and have been standardized for all industrial waste discharge to ground water permits issued by the Departments.

Condition G1 requires responsible officials or their designated representatives to sign submittals to the Department. Condition G2 requires the Permittee to allow the Departments to access the treatment system, production facility, and records related to the permit. Condition G3 specifies conditions for modifying, suspending or terminating the permit. Condition G4 requires the Permittee to apply to the Departments prior to increasing or varying the discharge from the levels stated in the permit application. Condition G5 requires the Permittee to submit written notice of significant increases in the amount or nature of discharges (typically new industrial discharges) into the sewer system tributary to the permitted facility. Condition G6 requires the Permittee to construct, modify, and operate the permitted facility in accordance with approved engineering documents. Condition G7 prohibits the Permittee from using the permit as a basis for violating any laws, statutes or regulations. Condition G8 requires application for

permit renewal 60 days prior to the expiration of the permit. Condition G9 requires the payment of permit fees. Condition G10 describes the penalties for violating permit conditions.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing the beneficial use of reclaimed water, including those limitations and conditions believed necessary to control toxics, and to protect human health and the beneficial uses of waters of the state of Washington. The Departments proposes that the permit be issued for five years.

REFERENCES FOR TEXT AND APPENDICES

Washington State Department of Ecology, 1993. Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems, Ecology Publication # 93-36. 20 pp.

Washington State Department of Ecology and Department of Health, 1997. Water Reclamation and Reuse Standards, Ecology Publication # 97-23. 73 pp.

Washington State Department of Ecology 1998. Chapter E-1, Criteria For Sewage Works Design, Ecology Publication # 98-37. 50 pp

Washington State Department of Ecology, 1996. Implementation Guidance for the Ground Water Quality Standards, Ecology Publication # 96-02.

Washington State Department of Health, 1994. Design Criteria for Municipal Wastewater Land Treatment, 10 pp

APPENDICES

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to issue a permit to the applicant listed on page one of this fact sheet. The permit contains beneficial use and use area conditions and effluent water quality limitations which are described in the rest of this fact sheet.

Public notice of application was published on March 1, 2006, and March 8, 2006, in the *Daily Chronicle* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) May 25, 2006, in the *Daily Chronicle* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Carey Cholski
Water Quality Permit Coordinator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, Washington 98504-7775

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30-day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-216-100). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing.

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (360) 407-6279, or by writing to the address listed above.

This fact sheet and permit were written by Craig L. Riley, P.E.; Water Reclamation & Reuse Program Lead, Washington State Department of Health.

APPENDIX B--GLOSSARY

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation--The average of the measured values obtained over a calendar month's time.

Beneficial Use – The use of reclaimed water, that has been transported from the point of production to the point of use without an intervening discharge to the waters of the state, for a beneficial purpose.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of the collection or treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Distribution Uniformity--The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Engineering Report--A document, signed by a professional licensed engineer, which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Groundwater Recharge Criteria – The contaminant criteria found in the drinking water quality standards adopted by the state board of health pursuant to chapter 43.20 RCW and the department of health pursuant to chapter 70.119A RCW.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Reclaimed Water – Effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for a beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater.

Sample Maximum -- No sample shall exceed this value.

Soil Scientist--An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Surface Percolation – The controlled application of water to the ground surface for the purpose of replenishing ground water.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Coliform Bacteria—Coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. A microbiological test is used to detect and enumerate the total coliform group of bacteria in water samples.

Total Dissolved Solids--That portion of total solids in water or wastewater that passes through a specific filter.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent pollution of the receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Cardinal Glass Influent Loading Determination

	Contaminant	Concentration, mg/L	
	BOD	550	
	TSS	570	
		Contaminant Load, PPD	
Flow Conditions	Flow Rate, MGD	BOD	TSS
Average - Max Month	0.00574	26.3	27.4
Maximum Production Capacity	0.02	91.7	95.1

APPENDIX D--RESPONSE TO COMMENTS

Comments were received by the Department of Ecology from Cardinal FG on June 19, 2006.

Cardinal FG Comments:

Page 5 and 6 of the draft permit provide a table which outlines the water quality limits which Cardinal's reclaimed water must meet prior to use in our SO2 scrubber/ESP pollution control system. Zenon Environmental Corporation, which is providing the reclaimed water production plant for Cardinal, has told us after review that based on the planned Cardinal facility; all water quality limits **with the exception of turbidity** can be met. Zenon guarantees to meet a limit of 1.0 NTUs turbidity for water effluent from the reclaimed water production plant. The limit as presented in the table on page 5 of the draft permit is 0.2 NTU average monthly and 0.5 NTU sample maximum.

Zenon's original proposal and design information included effluent characteristics which listed a turbidity limit of 1.0 NTU which was a tighter limit that the Washington State Water Reclamation and Reuse Standards by a factor of five. To guarantee the lower turbidity limits (0.2 and 0.5 NTU), Zenon states that a 1 mm fine microscreen would be required for pre-treatment. As stated earlier in the engineering reports, this microscreen would add a substantial amount to the initial plant construction and mostly operational costs, which we feel is unwarranted.

In addition, Zenon engineers have stated that a guaranteed limit of 1.0 NTU turbidity, the membrane failure occurs it will easily be seen in a turbidity level above 1.0 NTU as well as other support lab analyses results which would warrant immediate action to remedy the membrane failure.

Lastly, the end use of the reclaimed water at Cardinal Glass does not warrant the tighter limit for turbidity as is required in the draft permit. Cardinal plans to use all of the reclaimed water in a SO2 scrubber/ESP pollution control system. The dry SO2 stack gas scrubber is an air pollution control device which is designed to convert gaseous sulfur dioxide in the glass furnace flue gases into particulate which can then be controlled by an electrostatic precipitator. The reagent water (reclaimed water, cooling tower blowdown water, and city water) is mixed with sodium carbonate (soda ash) in the EP room and then sprayed into the scrubber tower to mix with the 600 degree Celsius hot flue gases. The soda ash solution reacts with the SO2 in the flue gases to form sodium sulfate (saltcake). The reagent water is completely evaporated in the SO2 scrubber tower. The sodium sulfate particulate and **other particulate which may have contributed to the turbidity in the reclaimed water** are then removed from the flue gases by passing through an electrostatic precipitator. The removed particulate (ESP dust) is recycled into the raw materials batch mix to make plate glass. The cleaned flue gases and evaporated water are discharged through a 175-foot stack.

Based on Cardinal's end use as described above for the reclaimed water, Cardinal feels that the tighter turbidity limit is unwarranted and the Zenon guaranteed turbidity limit of 1.0 NTU is tight enough to assure proper operation of the membrane technology and protection of the environment.

Departments of Health & Ecology Response:

The revision in the turbidity limits are imposed because of the quality of the product water that can be produced by the proposed treatment technology. These limits are consistent with the current state of practice and consistent with regulatory requirements for other states. The limits are set as the limit at which significant degradation of the membranes is identified by an increase in turbidity. Cardinal Float Glass has been made aware that the required turbidity limits and have been applied consistently throughout the project; it was unfortunate that these limits were not provided to the manufacturer during the bid process. It is also noted that these turbidity limits are discussed in the approved engineering report. The need for fine screens was raised at multiple times during the review of the permit application and engineering report and the Departments of Health and Ecology were assured that the proposed headworks would be adequate. In addition, the manufacturer is proposing to supply the same membranes to other potential customers using the same headworks as proposed for Cardinal Glass, but will guarantee turbidity limits of 0.2 and 0.5 NTU will be provided. Regional representatives of the manufacturer stated in a personal conversation that Cardinal Float Glass' membranes will be warranted to produce the required turbidity levels (0.2 NTU average and 0.5 NTU maximum) while using the proposed headworks.

The issue has been resolved and the permit will not be modified.